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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,846

04/17/2007

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7590

10/20/2008

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EXAMINER

FORDE, DELMA ROSA

ART UNIT

PAPER NUMBER

2828

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/550,846	<b>Applicant(s)</b> CALVEZ ET AL.	
	<b>Examiner</b> DELMA R. FORDE	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 April 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/17/2007</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of species in the reply filed on July 23, 2008 is acknowledged. The traversal is on the ground(s) that All of the present claims 1-32 are directed to vertical cavity devices and methods for manufacturing vertical cavity devices. Thus, all of the claims are closely related and present no undue burden to the Patent and Trademark Office in considering all the claims in the above-identified application. This is particularly true since each of the independent claims<sup>1</sup>, 25 and 32 read on the same species. This is found persuasive because the applicant it is right. The Election/Restriction is withdrawn.

### ***Priority***

The priority has been considered by the examiner.

### ***Information Disclosure Statement***

The references cited in the Information Disclosure Statement (IDS) have been considered by the examiner.

### ***Oath/Declaration***

The Oath/Declaration has been considered by the examiner.

### ***Drawings***

The drawing has been considered by the examiner.

### ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

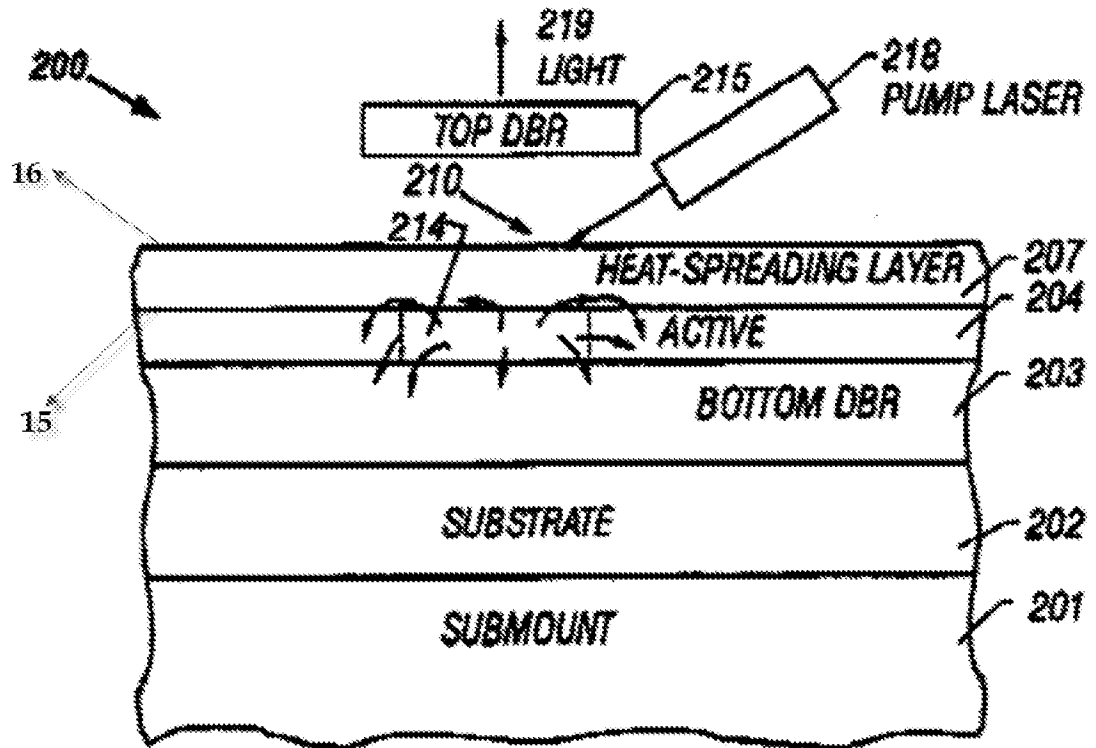
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 9 -11, 18 - 22, 25, 27 – 30 and 32 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Zheng (2003/0039284).

***Regarding claims 1, 6, and 10 – 11*** Zheng discloses a vertical-cavity device comprising: (a) a chip (see Figure 2, Character 200) comprising an active semiconductor layer (see Figure 2, Character 204) for providing configured to provide optical gain; (b) a first mirror (see Figure 2, Character 203) arranged on a first side of the active layer (see Figure 2, Character 204); (c) a second mirror (see Figure 2, Character 215) arranged on a second side of the active layer (see Figure 2, Character 204), opposite to the first mirror (see Figure 2, Character 203), and forming with at least the first mirror (see Figure 2, Character 203) an optically resonant cavity that passes through the active layer in a direction out of the plane of the active layer (see Figure 2, Character 204, Paragraphs [0002, 0009]); and (d) a heat spreader (see Figure 2, Character 207) for removing heat from the active layer (see Figure 2, Character 204 and Paragraphs [0029, 0037- 0038]), the heat spreader (see Figure 2, Character 207)

being arranged inside the cavity and having a first surface (see Figure 2, Character 15) adjacent to the chip and a second surface (see Figure 2, Character 16) opposite to the first surface, the heat spreader being transparent to light of wavelengths in an operating bandwidth of the device (Paragraph [0037]); and having at least one selected property that has a further selected effect on light output from the device (The Applicant on the specification (PGPub 2008/0043798) Paragraphs [0027] said: The inventors have realized that there is great potential to utilize the presence of the heat spreader to perform a further selected optical function, such as cavity control, that may be used to advantage in a compact, high-power, vertically emitting laser source or amplifier. Also, by providing the heat spreader inside the optical cavity, the further selected effect may be on intracavity light; intracavity light is generally more significantly affected by changes in the device than is extracavity light. The reference doesn't explicitly said heat spreader having at least one selected property that has a further selected effect on light output from the device, but explain a different characteristics has a heat spreader in addition to removing heat from active layer, (e.g. the heat spreader can carry the heat to other material of the array outside the VCSEL. In addition to helping lower and control the temperature of the active region, the existence of heat-spreading layer also helps to make the temperature in the active region more uniform, thereby further improving the operation and efficiency of VCSEL, (see Paragraphs [0026, 0032, 0037 – 0038, 0041 and 0059])).



The examiner modified the drawing to be clearer in the rejection.

**Regarding claim 9,** Zheng discloses the heat spreader focuses pump light into the active layer (Paragraph [0029, 0037- 0038]).

**Regarding claim 18,** Zheng discloses the second mirror is flat (see Figure 2, Character 215).

**Regarding claim 19,** Zheng discloses a second mirror is a MEMS mirror (Paragraph [0039], applicant don't explicitly said MEMS, but the applicant definition on PGPub 2008/0043798) said MEMS is a mirror could be used for fine tuning application and the reference use a mirror for reduce tuning).

**Regarding claims 20, 21 and 22**, Zheng discloses a second surface of the heat spreader has a dielectric coating, the dielectric coating is an anti-reflection coating and the dielectric coating is a mirror coating and forms the second mirror (Paragraph [0011 0030 and 0034]).

**Regarding claims 25 and 29**, Zheng discloses a method of manufacturing a vertical-cavity device comprising: (a) fabricating a chip (see Figure 2, Character 200) comprising an active semiconductor layer (see Figure 2, Character 204) for providing configured to provide optical gain; (b) providing a first mirror (see Figure 2, Character 203) arranged on a first side of the active layer (see Figure 2, Character 204); (c) providing a second mirror (see Figure 2, Character 215) arranged on a second side of the active layer (see Figure 2, Character 204), opposite to the first mirror (see Figure 2, Character 203), and forming with at least the first mirror (see Figure 2, Character 203) an optically resonant cavity that passes through the active layer in a direction out of the plane of the active layer (see Figure 2, Character 204, Paragraphs [0002, 0009]); and (d) providing in the cavity a heat spreader (see Figure 2, Character 207) for removing heat from the active layer (see Figure 2, Character 204 and Paragraphs [0029, 0037-0038]), the heat spreader (see Figure 2, Character 207) being arranged inside the cavity and having a first surface (see Figure 2, Character 15) adjacent to the chip and a second surface (see Figure 2, Character 16) opposite to the first surface, the heat spreader being transparent to light of wavelengths in an operating bandwidth of the



device (Paragraph [0037]); (e) selecting at least one property that has a further selected effect on light output from the device (The Applicant on the specification (PGPub 2008/0043798) Paragraphs [0027] said: The inventors have realized that there is great potential to utilize the presence of the heat spreader to perform a further selected optical function, such as cavity control, that may be used to advantage in a compact, high-power, vertically emitting laser source or amplifier. Also, by providing the heat spreader inside the optical cavity, the further selected effect may be on intracavity light; intracavity light is generally more significantly affected by changes in the device than is extracavity light. The reference doesn't explicitly said heat spreader having at least one selected property that has a further selected effect on light output from the device, but explain a different characteristics has a heat spreader in addition to removing heat from active layer like, (e.g. The heat spreader can carry the heat to other material of the array outside the VCSEL. In addition to helping lower and control the temperature of the active region, the existence of heat-spreading layer also helps to make the temperature in the active region more uniform, thereby further improving the operation and efficiency of VCSEL, (see Paragraphs [0026, 0032, 0037 – 0038, 0041 and 0059])).

***Regarding claim 27 and 28,*** Zheng discloses the curved surface is formed by polishing or the curved surface or the curved structure is formed by etching, the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

**Regarding claim 30**, Zheng discloses a source of pump light (see Figure 2, Character 218).

**Regarding claim 32**, Zheng discloses a vertical cavity device comprising: (a) a chip (see Figure 2, Character 200) comprising an active semiconductor layer (see Figure 2, Character 204) for providing optical gain; (b) a first mirror (see Figure 2, Character 203) arranged on a first side of the active layer (see Figure 2, Character 204) suitable for forming with at least a second mirror arranged (see Figure , Character ) on a second side of the active layer (see Figure 2, Character 204), opposite to the first mirror (see Figure 2, Character 203), an optically resonant cavity that passes through the active layer in a direction out of the plane of the active layer (see Figure 2, Character 204, Paragraphs [0002, 0009]; and (c) a heat spreader (see Figure 2, Character 207) for removing heat from the active layer (see Figure 2, Character 204 and Paragraphs [0029, 0037- 0038]), having a first surface (see Figure 2, Character 15) adjacent to the active layer (see Figure 2, Character 204) and a second surface (see Figure 2, Character 16) opposite to the first surface (see Figure 2, Character 15), the heat spreader (see Figure 2, Character 207) being transparent to light of wavelengths in an operating bandwidth of the device (Paragraph [0037]) and, in addition to removing heat from the active layer, at least one further selected property that has a further selected effect on light output from the device (The Applicant on the specification (PGPub 2008/0043798) Paragraphs [0027] said: The inventors have realized that there is great

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potential to utilize the presence of the heat spreader to perform a further selected optical function, such as cavity control, that may be used to advantage in a compact, high-power, vertically emitting laser source or amplifier. Also, by providing the heat spreader inside the optical cavity, the further selected effect may be on intracavity light; intracavity light is generally more significantly affected by changes in the device than is extracavity light. The reference doesn't explicitly said heat spreader having at least one selected property that has a further selected effect on light output from the device, but explain a different characteristics has a heat spreader in addition to removing heat from active layer, (e.g. The heat spreader can carry the heat to other material of the array outside the VCSEL. In addition to helping lower and control the temperature of the active region, the existence of heat-spreading layer also helps to make the temperature in the active region more uniform, thereby further improving the operation and efficiency of VCSEL, (see Paragraphs [0026, 0032, 0037 – 0038, 0041 and 0059])).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284) in view of Chang et al (6,711,310).

**Regarding claims 2 and 4**, Zheng discloses the claimed invention except for the heat spreader is birefringent and the further selected effect is on the polarization. Chang teaches the heat spreader is birefringent and the further selected effect is on the polarization. However, it is well known in the art to apply the heat spreader is birefringent and the further selected effect is on the polarization as disclosed by Chang in Column 6, Lines 43 – 48. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply the well known the heat spreader is birefringent and the further selected effect is on the polarization as suggested by Chang to the VCSEL of Zheng, because it could be to remove or direct away the light and could be used to transmit only rays of predetermined wavelength and control the polarization direction of the transmitted ray, see Chang in Column 6, Lines 43 – 48.

**Regarding claim 3**, Zheng discloses the claimed invention except for the difference in between the refractive indices of the heat spreader's slow and fast polarization axes is greater than 0.01. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make it greater or less than 0.01 the difference in between the refractive indices of the heat spreader's slow and fast polarization axes, since it has been held that where the general conditions of a

claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In addition, the selection of the difference in between the refractive indices of the heat spreader's slow and fast polarization axes, it's obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and *In re Aller*, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed [difference in between the refractive indices of the heat spreader's slow and fast polarization axes is greater than 0.01] or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen [difference in between the refractive indices of the heat spreader's slow and fast polarization axes is greater than 0.01] or upon another variable recited in a claim, the Applicant must show that the

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chosen [difference in between the refractive indices of the heat spreader's slow and fast polarization axes is greater than 0.01] are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284).

**Regarding claim 5**, Zheng discloses the claimed invention except for heat spreader has a nonlinear optical response. It would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known heat spreader has a nonlinear optical response as suggested by Zheng to the VCSEL because, that can happened, when the nonlinear and heat spreader has made with similar material, therefore generally be a property of the material of which is made, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Claims 7, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284).

**Regarding claims 7, 16 and 26**, Zheng discloses the claimed invention except

for second surface of the heat spreader is curved or includes a curves structure and the heat spreader has a shape selected to provide control of a spatial mode of the output light. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284) in view of Raymond et al. (6,393,038)

***Regarding claims 8 and 17***, Zheng discloses the claimed invention except for heat spreader focuses or defocuses intracavity light. Raymond teaches heat spreader focuses or defocuses intracavity light. However, it is well know in the art to apply the

heat spreader focuses or defocuses intracavity light as discloses by Raymond in (Column 5, Lines 49 – 53). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known heat spreader focuses or defocuses intracavity light as suggested by Raymond to the laser of Zheng, because could be used a lens to produce the focuses or defocuses intracavity light in the heat spreader see (Column 5, Lines 49 – 53) of Raymond.

Claims 12 – 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284).

**Regarding claim 12 and 14**, Zheng discloses the claimed invention except for the heat spreader has a refractive index that has been selected to provide substantially no refractive index step at the first surface and to provide a refractive index step at the first surface. It would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known heat spreader has a refractive index that has been selected to provide substantially no refractive index step at the first surface and to provide a refractive index step at the first surface as suggested by Zheng to the VCSEL, because two common properties of glass and other transparent materials are directly related to their refractive index. First, light rays change direction when they cross the interface from air to the material, an effect that is used in lenses or glass or



other transparent materials. Second, light reflects partially from surfaces that have a refractive index different from that of their surroundings and to vary as the light passes through it.

**Regarding claim 13**, Zheng discloses the claimed invention except for reflectance at the first surface of the heat spreader is less than 5%. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reflectance more than 5% at the surface of the heat spreader, since it has been held that where the general conditions of a claim is disclosed in the prior art, discovering the optimum or workable ranges involve only routine skill in the art. *In re Aller*, 105 USPQ 233.

In addition, the selection of reflectance at the first surface of the heat spreader, it's obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in

known process is ordinarily within skill or art) and *In re Aller*, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed [reflectance at the first surface of the heat spreader is less than 5%] or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen [reflectance at the first surface of the heat spreader is less than 5%] or upon another variable recited in a claim, the Applicant must show that the chosen [reflectance at the first surface of the heat spreader is less than 5%] are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284).

**Regarding claim 15**, Zheng discloses the claimed invention except for second surface of the heat spreader is at an angle to the layers of the chip. It would have been obvious to one having ordinary skill in the art at the time the invention was made to second surface of the heat spreader can has any type of angle (e.g. 90<sup>0</sup> degrees or 147<sup>0</sup> degrees), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In addition, the selection of second surface of the heat spreader it's obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed [second surface of the heat spreader is at an angle to the layers of the chip] or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen [second surface of the heat spreader is at an angle to the layers of the chip] or upon another variable recited in a claim, the Applicant must show that the chosen [second surface of the heat spreader is at an angle to the layers of the chip] are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claim 23, is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng

(2003/0039284).

**Regarding claim 23**, Zheng discloses the claimed invention except for heat spreader has a thickness of less than 1.5mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to the heat spreader can be more than 1.5, also thick enough to remove a not-insubstantial amount of heat from active region, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In addition, the selection of thickness of heat spreader, it's obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and *In re Aller*, 105 USPQ 233 (CCPA 1995) (selection of optimum a range within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed [heat spreader has a thickness of less than 1.5mm] or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen [heat spreader has a thickness of less than 1.5mm] or upon another variable recited in a claim, the Applicant must show that the chosen [heat spreader has a thickness of less than 1.5mm] are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (2003/0039284) in view of Yoshida et al (2002/0136254).

**Regarding claim 31**, Zheng discloses the claimed invention except for amplifier or laser is a Raman amplifier. Yoshida teaches amplifier or laser is a Raman amplifier. However, it is well known in the art to apply the amplifier or laser is a Raman amplifier as disclosed by Yoshida in Paragraphs [0005, 0010]. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known amplifier or laser is a Raman amplifier as suggested by Yoshida to the laser of Zheng, because could be used to construct to amplify any desired wavelength so long as pumping light source can be prepared. Raman gain produced by the pumping light to be stable, thereby preventing associated noise from being modulated onto the input signal see Paragraphs [0005 and 0010] of Yoshida.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DELMA R. FORDE whose telephone number is (571)272-1940. The examiner can normally be reached on M-T.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun O. Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 2828  
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